AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1.   (original): A digital audio encoding method comprising:

(a) determining a type of a window according to a characteristic of an input audio signal;

(b) generating a complex modified discrete cosine transform (CMDCT) spectrum from the input audio signal according to the determined window type;

(c) generating a fast Fourier transform (FFT) spectrum from the input audio signal, by using the determined window type; and

(d) performing a psychoacoustic model analysis, by using the generated CMDCT spectrum and FFT spectrum.

2.   (original): The method of claim 1, wherein the step (a) further comprises:

(a1) dividing the input audio signal into a plurality of subbands by filtering the input audio signal, and the step for determining the window type is performed for the input audio signal divided into subbands.

3.   (original): The method of claim 2, wherein the step (a1) is performed by a poly-phase filter bank.

4.   (original): The method of claim 1, wherein if the window type determined in the step (a) is a long window, a long CMDCT spectrum is generated by applying a long window in the step (b), a short FFT spectrum is generated by applying a short window in the step (c), and the psychoacoustic model analysis is performed based on the generated long CMDCT spectrum and short FFT spectrum in the step (d).

5.   (original): The method of claim 1, wherein if the window type determined in the step (a) is a short window, a short CMDCT spectrum is generated by applying a short window in the step (b), a long FFT spectrum is generated by applying a long window in the step (c), and the psychoacoustic model analysis is performed based on the generated short CMDCT spectrum and long FFT spectrum in the step (d).

6.   (original): The method of claim 1, wherein in the step (a), if the input audio signal is a transient signal, the type of the window is determined as a short window, and if the input audio signal is not a transient signal, the type of the window is determined as a long window.

7.   (original): The method of claim 1, further comprising:

(e) performing quantization and encoding based on the result of the psychoacoustic model analysis performed in the step (d).

8.   (original): The method of claim 1, wherein the psychoacoustic model is a model

used by one in a group comprising a motion picture experts group (MPEG)-1 layer 3, an MPEG-

2 advanced audio coding (AAC), an MPEG-4, and a windows media audio (WMA).

9.   (original): A digital audio encoding apparatus comprising:

a window switching unit which determines a type of a window according to a

characteristic of an input audio signal;

a CMDCT unit which generates a CMDCT spectrum from the input audio signal

according to the window type determined in the window switching unit;

an FFT unit which generates an FFT spectrum from the input audio signal, by using the

window type determined in the window switching unit; and

a psychoacoustic model unit which performs a psychoacoustic model analysis by using

the CMDCT spectrum generated in the CMDCT unit and the FFT spectrum generated in the FFT

unit.

10.   (original): The apparatus of claim 9, wherein the encoding apparatus further

comprises a filter unit which divides the input audio signal into a plurality of subbands by

filtering the input audio signal, and the window switching unit determines the window type

based on the output data of the filter unit.

11.   (original): The apparatus of claim 10, wherein the filter unit is a poly-phase filter

bank.

12.   (original): The apparatus of claim 9, wherein if the window type determined in the window switching unit is a long window, the CMDCT unit generates a long CMDCT spectrum by applying a long window, the FFT unit generates a short FFT spectrum by applying a short window, and the psychoacoustic model unit performs the psychoacoustic model analysis based on the long CMDCT spectrum generated in the CMDCT unit and the short FFT spectrum generated in the FFT unit.

13.   (original): The apparatus of claim 9, wherein if the window type determined in the window switching unit is a short window, the CMDCT unit generates a short CMDCT spectrum by applying the short window, the FFT unit generates a long FFT spectrum by applying a long window, and the psychoacoustic model unit performs the psychoacoustic model analysis, based on the short CMDCT spectrum generated in the CMDCT unit and the long FFT spectrum generated in the FFT unit.

14.   (original): The apparatus of claim 9, wherein if the input audio signal is a transient signal, the window switching unit determines the type of the window as a short window, and if the input audio signal is not the transient signal, determines the type of the window as a long window.

15.   (original): The apparatus of claim 9, further comprising:

a quantization and encoding unit which performs quantization and encoding based on the

audio data from the CMDCT unit and resultant values of the psychoacoustic model unit.

16.   (original): The apparatus of claim 9, wherein the psychoacoustic model is a model

used by one in a group comprising an MPEG-1 layer 3, an MPEG-2 AAC, an MPEG-4, and a

WMA.

17.   (currently amended): A digital audio encoding method comprising:

(a) generating a CMDCT spectrum from an input audio signal; and

(b) performing a psychoacoustic model analysis by using the generated CMDCT

spectrum, wherein the step (a) further comprises (a1) generating a long CMDCT spectrum and a

short CMDCT spectrum by performing CMDCT by applying a long window and a short window

to an input audio signal, and

wherein, in step (a), the CMDCT by applying the long window and the CMDCT by

applying the short window are performed at the same time.

18.   (canceled)

19.   (currently amended): The method of claim ~~18~~17, wherein in the step (b) a

psychoacoustic model analysis is performed by using the long CMDCT spectrum and short

CMDCT spectrum generated in the step (a1).

20.   (original): The method of claim 17, wherein the step (a) further comprises:

(a1) dividing the input audio signal into a plurality of subbands by filtering the input audio signal, and the step for generating the CMDCT spectrum is performed for the input audio signal divided into subbands.

21.   (original): The method of claim 17, further comprising:

(a1) determining a type of a window, according to a characteristic of the input audio signal.

22.   (original): The method of claim 21, wherein in the step (a1) if the input audio signal is a transient signal, the window type is determined as a short window, and if the input audio signal is not the transient signal, the window type is determined as a long window.

23.   (original): The method of claim 20, wherein the step (a1) is performed by a polyphase filter bank.

24.   (original): The method of claim 22, wherein if the window type determined in the step (a1) is the long window, quantization and encoding of a long MDCT spectrum are performed based on a result of the psychoacoustic model analysis performed in the step (b), and if the window type determined in the step (a1) is the short window, quantization and encoding of a short MDCT spectrum are performed based on the result of the psychoacoustic model analysis performed in the step (b).

25.   (original): The method of claim 17, wherein the psychoacoustic model is a model

used by one in a group comprising an MPEG-1 layer 3, an MPEG-2 AAC, an MPEG-4, and a

WMA.

26.   (currently amended): A digital audio encoding apparatus comprising:

a CMDCT unit which generates a CMDCT spectrum from an input audio signal; and

a psychoacoustic model unit which performs a psychoacoustic analysis by using the

CMDCT spectrum generated in the CMDCT unit,

wherein the CMDCT unit generates a long CMDCT spectrum and a short CMDCT

spectrum by performing a CMDCT by applying a long window and a short window to the input

audio signal, and

wherein the CMDCT by applying the long window and the CMDCT by applying the

short window are performed at the same time.

27.   (canceled)

28.   (currently amended): The apparatus of claim 2726, wherein the psychoacoustic

model unit performs a psychoacoustic analysis by using the long CMDCT spectrum and short

CMDCT spectrum generated in the CMDCT unit.

29.   (original): The apparatus of claim 26, further comprising:

a filter unit which divides the input audio signal into a plurality of subbands by filtering

the input audio signal, wherein the CMDCT unit performs CMDCT for the data divided into

subbands.

30.   (original): The apparatus of claim 26, further comprising:

a window type determining unit which determines a type of a window, according to a

characteristic of the input audio signal.

31.   (original): The apparatus of claim 30, wherein, if the input audio signal is a

transient signal, the window type determining unit determines the window type as a short

window, and if the input audio signal is not the transient signal, determines the window type as a

long window.

32.   (original): The apparatus of claim 29, wherein the filter unit is a poly-phase filter

bank.

33.   (original): The apparatus of claim 31, further comprising:

a quantization and encoding unit wherein if the window type determined in the window

type determining unit is the long window, the quantization and encoding unit performs

quantization and encoding of a long MDCT spectrum, based on a result of the psychoacoustic

model analysis performed in the psychoacoustic model unit, and if the window type determined

in the window type determining unit is the short window, performs quantization and encoding of

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a short MDCT spectrum, based on the result of the psychoacoustic model analysis performed in

the psychoacoustic model unit.

34.   (original): The apparatus of claim 26, wherein the psychoacoustic model is a

model used by one in a group comprising an MPEG-1 layer 3, an MPEG-2 AAC, an MPEG-4,

and a WMA.

35.   (original): A computer-readable recording medium for recording a computer

program code for enabling a computer to provide a service of encoding input audio signals, the

service comprising steps of:

(a) determining a type of a window according to a characteristic of an input audio signal;

(b) generating a complex modified discrete cosine transform (CMDCT) spectrum from

the input audio signal according to the determined window type;

(c) generating a fast Fourier transform (FFT) spectrum from the input audio signal, by

using the determined window type; and

(d) performing a psychoacoustic model analysis, by using the generated CMDCT

spectrum and FFT spectrum.

36.   (original): The computer-readable recording medium of claim 35, wherein the

step (a) further comprises:

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(a1) dividing the input audio signal into a plurality of subbands by filtering the input audio signal, and the step for determining the window type is performed for the input audio signal divided into subbands.

37. (original): The computer-readable recording medium of claim 36, wherein the step (a1) is performed by a poly-phase filter bank.

38. (original): The computer-readable recording medium of claim 35, wherein if the window type determined in the step (a) is a long window, a long CMDCT spectrum is generated by applying a long window in the step (b), a short FFT spectrum is generated by applying a short window in the step (c), and the psychoacoustic model analysis is performed based on the generated long CMDCT spectrum and short FFT spectrum in the step (d).

39. (original): The computer-readable recording medium of claim 35, wherein if the window type determined in the step (a) is a short window, a short CMDCT spectrum is generated by applying a short window in the step (b), a long FFT spectrum is generated by applying a long window in the step (c), and the psychoacoustic model analysis is performed based on the generated short CMDCT spectrum and long FFT spectrum in the step (d).

40. (original): The computer-readable recording medium of claim 35, wherein in the step (a), if the input audio signal is a transient signal, the type of the window is determined as a

short window, and if the input audio signal is not a transient signal, the type of the window is

determined as a long window.

41.   (original): The computer-readable recording medium of claim 35, further

comprising:

(e) performing quantization and encoding based on the result of the psychoacoustic

model analysis performed in the step (d).

42 - 43.   (canceled)